

**DRAFT ENVIRONMENTAL ASSESSMENT**

**for**

**ISSUANCE OF AN ENDANGERED SPECIES ACT  
SECTION 10(a)(1)(B) INCIDENTAL TAKE  
PERMIT FOR THE INDIANA BAT (*Myotis sodalis*)  
TO THE INTERAGENCY TASK FORCE  
PROPOSING THE SIX POINTS ROAD  
INTERCHANGE AND RELATED DEVELOPMENT**

**MARION AND HENDRICKS COUNTIES, INDIANA**

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**United States Fish and Wildlife Service  
Bloomington Field Office  
620 South Walker Street  
Bloomington, Indiana 47403-2121**

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# DRAFT ENVIRONMENTAL ASSESSMENT FOR ISSUANCE OF AN ENDANGERED SPECIES ACT SECTION 10(a)(1)(B) INCIDENTAL TAKE PERMIT FOR THE INDIANA BAT (*Myotis sodalis*) TO THE INTERAGENCY TASK FORCE PROPOSING THE SIX POINTS ROAD INTERCHANGE AND RELATED DEVELOPMENT

## 1. PROJECT PURPOSE AND NEED

### 1.1 Background

An Interagency Task Force composed of the Federal Highway Administration, the Indiana Department of Transportation, the Indianapolis Airport Authority, the Indianapolis Department of Public Works, the Indianapolis Department of Metropolitan Development, and the Hendricks County Board of County Commissioners proposes to construct a new interchange on Interstate 70 (I-70) and associated highway improvements in the vicinity of Six Points Road in Hendricks and Marion Counties, Indiana. Additional development will occur in the area in association with the road construction. Associated development includes: 1) expansion and improvements at the Indianapolis International Airport; and 2) commercial and industrial development within the privately owned AmeriPlex area south of I-70. It has been determined through surveys that a colony of federally endangered Indiana bats (*Myotis sodalis*) summers in the project area. (The Indiana bat is a migratory species which hibernates in caves during winter and then migrates to summer range). The Biological Assessment conducted by the applicants (American Consulting Engineers, Inc. 1996) concluded that the proposed actions will result in incidental take of the Indiana bat; the U.S. Fish and Wildlife Service (Service) concurred with this finding. Therefore, the Task Force has voluntarily submitted an application for a permit for incidental take as a means of complying with the Endangered Species Act (ESA) of 1973, as amended.

The submission of the ESA Section 10(a)(1)(B) incidental take permit application requires the development of a Habitat Conservation Plan (HCP) by the applicants which details the measures which will be taken to avoid, minimize, and mitigate impacts to Indiana bats. Prior to issuing the permit, the Service is required to analyze alternatives considered in the development of the HCP. This document is the Environmental Assessment (EA) required by the National Environmental Policy Act (NEPA) as documentation for the Federal action (by the Service) of issuance of a permit under Section 10(a)(1)(B) of the ESA. This document does not serve to fulfill the NEPA requirements of the applicants for their proposed actions; the Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995) serves that purpose.

The Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995) was prepared by the applicants to determine the preferred alternative for the construction of the Six Points Road Interchange and related developments (which are a component of the activities being considered in the HCP submitted by the applicants). During the completion of that Environmental Assessment (EA) the Service attended a number of

meetings to address wetland, stream relocation, and endangered species impacts. The Service attended meetings on February 3, 1995, March 28, 1995, May 18, 1995, and July 13, 1995. Coordination completed during those meetings was assimilated into the development of project alternatives.

The Service's major role in avoiding and minimizing impacts to the Indiana bat during the development of build alternatives was the final juxtaposition of the road interchange and the treatment of riparian relocation and restoration in relation to Indiana bat habitat. It was noted that subtle changes in the juxtaposition of the interchange would result in significant changes in the magnitude of Indiana bat habitat impacts. Specifically, because the East Fork of White Lick Creek is located near the end of existing runways and other airport infrastructure, most of the original alternatives would have placed the roadway and intersection over a significant portion of the East Fork of White Lick Creek. The wooded riparian corridor along the East Fork of White Lick Creek is excellent Indiana bat foraging and roosting habitat. Through coordination with the Service, the alternative selected positioned the northern portion of the roadway to the west of East Fork of White Lick Creek avoiding the existing riparian corridor. The roadway will cross the creek at a previously disturbed reach; and the interchange will be placed east of the creek's wooded corridor.

Due to the size and complexity of the interchange, several small streams will be crossed and subsequently their riparian corridors impacted. During coordination for the development of the preferred alternative, options ranged from encasing many of the streams into concrete culverts to relocating the streams outside the footprint of the interchange and restoring riparian habitat along relocated stream channels. The latter option was selected. Within the constraints of the purpose and need of the EA, the Service concurred that the preferred alternative minimized and avoided Indiana bat impacts. As a result of prior Indiana bat surveys and monitoring within the project area, extensive data on Indiana bats were available when the EA was prepared. Impacts on the Indiana bat were discussed in the EA, along with a number of potential mitigation measures that could be completed to minimize impacts that could not be avoided by implementing the preferred alternative. The EA also discussed the applicants' acknowledgment that an Incidental Take Permit would be required under the ESA. Coordination was initiated under ESA Section 7, but in consultation with the Service the applicants determined that continued coordination under ESA Section 10 and the preparation of an HCP would provide for a more comprehensive approach to addressing project impacts to Indiana bats.

## 1.2 Purpose

The purpose for this Environmental Assessment is to evaluate the application for an ESA Section 10(a)(1)(B) permit, submitted by the Task Force, to allow for incidental take of the federally-listed Indiana bat that is expected to result from the highway improvements and associated development in the vicinity of the Indianapolis International Airport. These actions will result in the loss of 139 ha of bat habitat; impacted parcels are shown in Figure 1. Incidental take of bats is expected to occur as the result of this habitat loss. The implementing regulations for Section

10(a)(1)(B) of the Act, as provided at 50 C.F.R. Section 17.22, specify the requirements for obtaining a permit allowing the incidental take of listed species pursuant to otherwise lawful activities.

The submission of the incidental take permit application requires the development of an HCP by the applicants which details the measures which will be taken to avoid, minimize, and mitigate impacts to Indiana bats. The purpose of the HCP is to ensure that any incidental taking that might occur will be minimized and mitigated to the maximum extent practicable and will not appreciably reduce the likelihood of the survival and recovery of this species in the wild. The Task Force has designed the HCP in consultation with the Service to ensure that the project area will continue to support suitable habitat for the Indiana bat and to aid in the recovery of the species, while allowing for any incidental take of Indiana bats that may occur as the result of the proposed activities.

### 1.3 Need

The Service has determined that the proposed highway construction and related development in the vicinity of the Indianapolis International Airport will result in take of the Indiana bat. The development of the HCP and the application for an ESA Section 10(a)(1)(B) incidental take permit are steps taken by the applicants to ensure that any take of Indiana bats, resulting from their otherwise lawful activities, does not violate the take prohibition of ESA Section 9. As part of this process, the Service needs to evaluate the alternatives considered by the applicants for avoiding, minimizing, and mitigating take of bats. The Service will select an alternative that will not harm the future recovery of the Indiana bat, and is expected to enhance the long-term conservation of the species in the vicinity of the project area. The selected alternative needs to include the following elements to provide for the conservation of Indiana bats: 1) seasonal restrictions on the clearing of trees for the project to avoid direct mortality of bats roosting in trees; 2) protection of an adequate amount of existing habitat in the immediate vicinity of project impacts to allow the Indiana bat colony that inhabits the area to persist; emphasis should be on protection of riparian habitat and habitat that links existing habitat fragments; and 3) planting of hardwood seedlings to enhance long-term habitat conditions for Indiana bats in vicinity of the project area; emphasis should be on linking existing habitat patches and creating larger blocks of forested habitat.

The Service consulted with the project applicants in selecting an alternative to ensure that the alternative also addresses the needs of the applicants. The applicants have evaluated the need for the proposed development for many years; the need was formally stated in the 1995 EA prepared by the applicants. Recent industrial development near the Indianapolis International Airport, coupled with residential and commercial development in the surrounding area, has intensified the need for the improvements since they were originally proposed. The primary concern of the applicants with reference to the Service's involvement in the project is that the incidental take permitting process does not alter the timing or cost of the project to an unreasonable degree. The Service considered these concerns in the analysis of alternatives.

## 2. ALTERNATIVES

Extensive data on the ecology of Indiana bats in the project area were available to the Service in the analysis of the alternatives considered here. Research was conducted on Indiana bats in the project area during the summers of 1994 through 2000 (3D Environmental Services Inc. 1994; 3D Environmental Services Inc. 1995; 3D Environmental Services Inc. 1996; American Consulting Engineers, Inc. 1998; American Consulting Engineers, Inc. 1999; American Consulting, Inc. 2000; John Whitaker, Indiana State University, personal communication).

### 2.1 Alternatives Not Considered for Detailed Analysis

#### 2.1.1 Mitigating Impacts through Planting

Early in the consultation on HCP alternatives, the project applicants proposed mitigating impacts to Indiana bats by establishing mitigation plantings to replace bat habitat that would be lost through the project. Mitigation plantings were to be located such that, in the long-term, a larger block of forested habitat would be available to bats in the vicinity of the project area, compared to the current highly fragmented nature of forested habitat. While the Service concurred that a larger block of forested habitat was a desirable future condition for the bats, we rejected this alternative from further consideration because it did not address current habitat conditions for bats, and therefore did not adequately minimize impacts.

### 2.2 Alternatives Carried Forward for Detailed Analysis

#### 2.2.1 Alternative 1 - No Action Alternative: Avoiding Impacts Through Seasonal Tree Clearing

Under the No Action Alternative, no application for an incidental take permit would be made or processed and the HCP would not be implemented.

Cutting an Indiana bat roost tree when bats are present in the tree is likely to result in bats being injured or killed. For many projects which involve the clearing of trees within the summer range of the Indiana bat, the Service requires that the trees be removed between September 16 and April 14, when Indiana bats are not known to occupy maternity roosts. Seasonal tree clearing restrictions may be the only measure required to avoid and minimize impacts to Indiana bats in some circumstances. In these cases, no incidental take permit is required because the Service has adequate information to document that take of Indiana bats can be avoided through seasonal tree clearing.

The Service reviewed the biological information that was available on the habitat in the project area and the data that have been collected on the maternity colony of Indiana bats that utilizes the project area to determine if seasonal tree clearing restrictions would be adequate to avoid take of Indiana bats for the activities proposed in the vicinity of the Indianapolis International Airport. If project applicants could avoid take of bats through seasonal tree clearing restrictions, then the

HCP would not be required because no incidental take permit would be required.

#### 2.2.2 Alternative 2 - Develop an HCP which includes a Conservation Easement on the Maternity Roost Site Parcel

Based on data gathered from radio-tagged Indiana bats, it is known that at least one maternity colony of Indiana bats utilizes the proposed project area. The primary roost tree (used by the maternity colony from 1996-2000) and all of the alternate maternity roost trees that have been identified are located outside the HCP boundary. The primary roost and most of the alternate roosts are located in a privately owned woodlot, approximately 36 ha in size. The woodlot is dominated by mature mixed hardwood trees, including many large shagbark hickories which are used extensively by roosting bats. The data collected to date suggest that this woodlot is an important element of the habitat used by this maternity colony.

Early in the consultation on the proposed project, the Service and the applicants agreed that permanent protection of this woodlot could serve as a cornerstone of the minimization/mitigation program for the HCP. The applicants proposed that the major conservation measures that would be provided in the HCP to avoid, minimize, and mitigate impacts to Indiana bats would include: 1) protection (through 25-50 year conservation easement) of the woodlot which contained the primary roost tree; 2) seasonal tree cutting restrictions; and 3) hardwood seedling mitigation plantings.

The applicants originally sought to acquire the parcel containing the primary roost tree for permanent protection, but based on negotiations with the landowner it was determined that a 25-50 year conservation easement would be the longest term of protection that would be considered. The applicants also determined that the cost of acquiring the conservation easement on this parcel would be high (higher than estimated fair market value). The applicants also noted that negotiations for acquiring the easement would likely be lengthy and delay the project.

Seedling plantings would be planned to improve the connectivity of forested fragments within the range of the maternity colony. Seedling plantings would be established both within the HCP boundary and within the Indianapolis Airport Authority's Conservation Management Area. Survival of seedlings planted for mitigation would be monitored, and remedial action taken if survival dropped below an acceptable level. The Conservation Management Area is an area south of the HCP boundary where the Indianapolis Airport Authority (IAA) has concentrated mitigation for impacts to Indiana bat habitat, and has also done wetland restoration to mitigate for wetland impacts. Telemetry data has demonstrated that the area south of the HCP boundary, including the Conservation Management Area, is the most intensively used area by the Indiana bat maternity colony; therefore, mitigation is concentrated in this area. The Conservation Management Area and the juxtaposition of this area to the HCP boundary are shown in Figure 2. As shown in Figure 2, the boundary of the Conservation Management Area is 765 ha, but this includes 253 acres of privately owned land. (Note that the IAA has a very active land acquisition program in this area, and the acreage of privately owned land is likely to decrease over time). No mitigation plantings



under the HCP will occur on privately owned land; only lands owned by the IAA will be used for mitigation. Parcels owned by the IAA outside the Conservation Management Area, but within the immediate area, may be considered for planting if it is determined by the Service that these parcels have exceptional potential to improve habitat connectivity for the Indiana bat colony that inhabits the area.

### 2.2.3 Alternative 3 - Proposed Action: Develop an HCP which includes Permanent Protection of Existing Bat Habitat, Mitigation Plantings, and an Extensive Research and Monitoring Program

The proposed action is the issuance of an incidental take permit under Section 10(a)(1)(B) of the Act to authorize the incidental take of the endangered Indiana bat that is expected to occur as the result of activities proposed by the applicants. An HCP has been developed as part of this proposed alternative to avoid, minimize, and mitigate impacts to Indiana bats to the maximum extent practicable. This alternative also addresses the concerns of the applicants, that is, that the incidental take permitting process does not alter the timing or cost of the project to an unreasonable degree.

Key elements unique to this alternative are that the applicants would permanently protect a minimum of 151 ha of existing Indiana bat habitat. Increasing pressure for development in the area surrounding the Indianapolis International Airport may lead to additional losses of bat habitat. Permanent protection of existing habitat is needed for the persistence of the Indiana bat maternity colony that uses the project area. This alternative also provides for an extensive bat research and monitoring program and a public outreach/education program.

The following Conservation Measures have been incorporated into the HCP by the project applicants; these measures are designed specifically to avoid, minimize, and mitigate the impacts of the proposed action on Indiana bats.

#### 1. Seasonal Tree Cutting Restrictions

No trees will be cleared between April 15 and September 15, the dates during which Indiana bats may occupy maternity roosts in the project area.

#### 2. Permanent Protection of Existing Indiana Bat Habitat within the HCP Boundary

Other than 139 ha of bat habitat that will be cleared for the proposed development, no Indiana bat habitat (e.g., forested land, open areas with scattered trees, fencelines) that is owned by the IAA will be cleared within the HCP boundary. A minimum of 71 ha of existing bat habitat that is owned by the IAA will be protected in perpetuity within the HCP boundary; parcels to be protected are shown in Figure 1. There will be no manipulation of woody vegetation in these areas without consultation with the Service's Bloomington, Indiana Field Office (BFO) to ensure that any activity which occurs will be beneficial to Indiana bats.

### 3. Permanent Protection of Existing Indiana Bat Habitat Outside the HCP Boundary.

The IAA will permanently protect a minimum of 80 ha of existing bat habitat that they own outside the HCP boundary. These areas will be selected from existing bat habitat within the IAA's Conservation Management Area (Figure 2). Only lands owned by the IAA will be selected for permanent protection. Bat habitat to be set aside for permanent protection will be selected in consultation with the Service's BFO to insure that the parcels are within the range of the maternity colony and will benefit the colony. The IAA will give consideration to acquiring parcels that are outside the Conservation Management Area, but in the immediate vicinity, if the Service identifies parcels that are considered particularly valuable to the Indiana bat colony that occupies this area. Emphasis will be on protecting parcels along the East Fork of White Lick and parcels which will improve the connectivity of existing habitat patches to the creek corridor. There will be no manipulation of woody vegetation in these areas unless the Service's BFO concurs that the activity will be beneficial to Indiana bats.

### 4. Mitigation Plantings

As part of the proposed mitigation, a minimum of 140 ha of hardwood seedlings will be planted and protected in perpetuity. The goal of the plantings is to enhance Indiana bat habitat in the long term by providing forested riparian habitat, improving connectivity among blocks of existing habitat, and creating larger blocks of forested bat habitat. Planting will occur over a period of 5 years, beginning with the first year of construction. A minimum of 42 ha of the planting will be completed in the first year of construction, and at least 25% of the remaining planting will be completed during each of the following four years (until at least 140 ha of planting has been completed).

Seedling plantings would be planned to improve the connectivity forested habitat within the range of the maternity colony, particularly along the corridor of the East Fork of White Lick Creek. Riparian areas are known to provide valuable habitat for Indiana bats, and also serve as travel corridors for bats which will help to link existing patches of bat habitat. Seedling plantings would be established both within the HCP boundary and within the IAA's Conservation Management Area. The Conservation Management Area, as shown in Figure 2, is an area south of the HCP boundary that is intensively used by Indiana bats; therefore, proposed mitigation is concentrated in this area. As shown in Figure 2, the boundary of the Conservation Management Area is 765 ha, but this includes 253 acres of privately owned land. No mitigation plantings under the HCP will occur on privately owned land; only lands owned by the IAA will be used for mitigation. Parcels owned by the IAA outside the Conservation Management Area, but within the immediate area, may be considered for planting if it is determined by the Service that these parcels have exceptional potential to improve habitat connectivity for the Indiana bat colony that inhabits the area.

The details of the proposed mitigation planting are provided in the applicants' HCP and have been developed in consultation with the Service. In the long term, the plantings would provide a

diverse woodland that is well stocked with species of trees that are known to provide high quality Indiana bat roosting habitat. Plantings will be monitored to insure that at least 80% of the initial planting survives; if survival is below 80% five years after planting, then remedial measures will be taken. There will be no manipulation of vegetation in these areas without consultation with the Service's BFO.

#### 5. Deed Restrictions

The permanent protection of designated areas (included existing bat habitat and mitigation planting areas) will be insured by deed restrictions.

#### 6. Monitoring and Research Program.

The purpose of the monitoring plan proposed in the HCP is: 1) to assess the effectiveness of mitigation efforts over time; 2) to provide for adaptive management (i.e., determine the need for adjustments to management of the Indiana bat habitat); and 3) to collect valuable scientific data that will contribute to the recovery of the Indiana bat.

The proposed Indiana bat monitoring plan includes an extensive mist netting survey. Mist net surveys to determine the presence of Indiana bats will be conducted annually for the duration of the HCP, beginning with the first summer following the start of construction. It is assumed construction will begin early in 2002 under the current project time line. Therefore, mist netting is anticipated to occur annually from 2002 through 2016 (or for a total period of 15 years).

The applicants propose that Indiana bats captured during the mist netting surveys will be fitted with radio transmitters. Telemetry data will be used to document the location of roost trees and the foraging range of the colony. Emergence (dusk) counts will be conducted at each known primary maternity roost tree during the period when bats are present in the vicinity of the project area to better define the biology of the resident population.

#### 7. Public Outreach/Educational Program.

The applicants have agreed to work with the Service's BFO to develop and implement an outreach program to educate the public regarding the Indiana bat.

### 3. AFFECTED ENVIRONMENT

#### 3.1 Physical Characteristics

The proposed project is located in eastern Hendricks and western Marion Counties in central Indiana. Much of the project area is rural in nature, but extends into the west edge of the greater Indianapolis metropolitan area, to the east edge of the growing Plainfield commercial/industrial district, and the south edge of the Indianapolis International Airport. The small communities of

Six Points and Bridgeport are located at the north end of the project. Another small community, Camby, is located near the south project terminus.

Historically, land use in this area evolved much the same as is typical for central Indiana. Native woodland was cleared for farming. Gradually, due to the close proximity to Indianapolis, residential development increased. Several small subdivisions and many residential corridor developments are scattered throughout the project area. Road right-of-ways and several major public utility easements cross through the area. The remaining land use is dominated by agricultural parcels.

### 3.2 Biological Environment

#### 3.2.1 Habitat/Vegetation

The natural environment of the project area is summarized below. Additional information is available in the Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995).

The project area is within the Tipton Till Plain Section of the Central Till Plain Natural Region of Indiana (Homoya et al. 1985). This section is characterized by a mostly undissected plain which was formerly covered by an extensive beech-maple-oak forest. The soils are typically poorly drained silt and silty clay loams. Tree species typical of this section include red maple (*Acer rubrum*), pin oak (*Quercus palustris*), bur oak (*Q. macrocarpa*), swamp white oak (*Q. bicolor*), Shumard's oak (*Q. shumardii*), American elm (*Ulmus americana*), and green ash (*Fraxinus pennsylvanica*). On better drained sites beech (*Fagus grandifolia*), sugar maple (*A. saccharum*), black maple (*A. nigrum*), white oak (*Q. alba*), red oak (*Q. rubra*), shagbark hickory (*Carya ovata*), tulip poplar (*Lireodendron tulipifera*), red elm (*Ulmus rubra*), basswood (*Tilia americana*) and white ash (*F. americana*) are also considered characteristic (Homoya et al. 1985).

The native flatwoods community in this section is now largely confined to scattered woodlots; the majority of the area has been converted to agricultural land uses. In the project area, agriculture, expansion of the Indianapolis International Airport, and residential and commercial development in the vicinity of the Indianapolis International Airport have resulted in extensive clearing and construction.

#### 3.2.2 Threatened, Endangered, and Candidate Species

The Indiana bat (*Myotis sodalis*) is the only federally-listed species known or suspected to be present in the project area. There are no federal candidate species in the project area. Indiana bats are dependent on forested habitat during summer; the species roosts in trees and forages primarily in forests or open areas adjacent to forests. The remaining forested habitat within the project area occurs along stream corridors and in scattered patches of forest. Within the HCP boundary, 247 ha is categorized as bat habitat; approximately half of the area classified as bat habitat is mature

forest. The remainder is composed of grassy areas with scattered trees, immature woods, or narrow bands of trees (e.g., fencerows). Bat habitat comprises approximately 17% of the land area within the HCP boundary. These wooded, or partially wooded parcels, provide habitat for the Indiana bats which summer in the project area.

Habitat quality for Indiana bats in the project area was assessed in the Biological Assessment: Effects of the Six Points Road Interchange and Related Roadway Improvements in Hendricks and Marion Counties, Indiana on the Indiana Bat, *Myotis sodalis* (American Consulting Engineers, Inc. 1996). The analysis area in this assessment was limited to the right-of-way required for road improvements. Approximately 83.4 acres of bat habitat were assessed; 50.2 acres, 9.0 acres, and 24.2 acres were categorized as high, moderate, and low quality habitat, respectively. A rigorous quantitative assessment of habitat quality was not done for the remainder of the project area. However, Service biologists did a qualitative assessment of Indiana bat habitat conditions in the project area. Based on that assessment, we anticipate that habitat conditions in the entire project area are similar to conditions in the 83.4 acres that were assessed using the model developed for the biological assessment (American Consulting Engineers, Inc. 1996). There are scattered patches of high quality Indiana bat habitat remaining in the project area. Inside the HCP boundary, there are 139 ha of land that is categorized as bat habitat that will be cleared for the proposed project. Included in this 139 ha are: 1) 58.3 ha (42%) of mature forest; 2) 48.2 ha (35%) of grassy areas with widely scattered trees (many of these areas were formerly residential lawns); 3) 28.0 ha (20%) of sparsely forested areas (e.g., wooded pasture) or immature woodlots; and 4) 4.1 ha (3%) of linear forested habitat (e.g., fencerows). Of these areas, only the mature forest has the potential to provide high quality roosting and foraging habitat for bats. In the remaining parcels, potential roosting habitat may be provided in those areas that have mature trees, and all of the area characterized as bat habitat provides foraging habitat.

Overall, the quantity of Indiana bat habitat is of greater concern than the quality of the remaining habitat. As previously noted, much of the land categorized as bat habitat in the project area only supports scattered or immature trees (i.e., not mature deciduous forest). Based on a thorough review of literature on Indiana bat summer habitat, Romme et al. (1995) concluded that areas with less than 5% cover by deciduous forest will not support summering Indiana bats. Areas considered optimal are generally at least 30% forested. Forest cover within the project area is potentially approaching the minimum required to support summering Indiana bats.

Extensive research was conducted on Indiana bats in the project area during the summers of 1994 through 2000. Mist netting in August 1994 resulted in the capture of two Indiana bats along the East Fork of White Lick Creek, immediately south of the project area (3D Environmental Services Inc. 1994). One of the Indiana bats captured was a post-lactating female and the other a juvenile male; the capture of a post-reproductive adult female and a juvenile Indiana bat provided evidence that a maternity colony was located in the immediate vicinity of the project area. Mist netting (conducted along the East Fork of White Lick Creek and near an Indiana bat maternity roost tree) during the next five summers (1995-1999) resulted in the capture of 34 Indiana bats: 6 in 1995 (3D Environmental Services Inc. 1995); 7 in 1996 (3D Environmental Services Inc. 1996); 3 in

1997 (American Consulting Engineers, Inc. 1998); 8 in 1998 (American Consulting Engineers, Inc. 1999); and 10 in 1999 (American Consulting, Inc. 2000). The 34 Indiana bats captured included 15 reproductively active adult females, three nonreproductive (or reproductive status unknown) adult females, one adult male, and 15 juveniles. Two additional adult male Indiana bats were captured in artificial roosting structures erected in the project area; one was captured in 1995 and one in 1996.

During the period 1995-1999, radio transmitters were attached to 30 of the bats captured in the project area. The bats movements were monitored, allowing researchers to assess the roosting and foraging habits of the Indiana bats in the project area. Based on data gathered from radio-tagged Indiana bats, it is known that at least one maternity colony of Indiana bats utilizes the proposed project area, but the possibility that more than one maternity colony is using the project area can not be eliminated.

Telemetry enabled researchers to collect information on the roosting habits of bats in the project area. All known roost trees used by the maternity colony are located south of the HCP boundary. Two primary roost trees used by the maternity colony have been located using telemetry. The definition of a primary roost is a tree used by more than 30 bats and used on more than one occasion (Callahan 1993). One of these trees (a dead cottonwood) was used in 1997 and 1998. The maximum number of bats counted exiting this tree was 64 during a dusk count in 1998. This tree lost a major portion of its bark during a storm in 1998, and was not used subsequently. The other primary roost tree was first located in 1996, and was used again in 1997, 1998, 1999, and 2000. This tree is a large (59.3 cm diameter at breast height) dead shagbark hickory tree. In excess of 100 dusk counts have been conducted at this roost tree since its discovery. The maximum number of bats counted during any given dusk count was 146 on July 15, 1999. Large fluctuations in the number of bats utilizing this tree suggest that there are other primary roost trees being used by this colony, but no other primary roosts have been identified since the loss of the cottonwood roost in 1998 (American Consulting Engineers, Inc. 1999).

Large numbers of alternate roost trees were also located by tracking radio-tagged bats to their roosts. (All trees used by roosting bats that do not meet the definition of a primary roost tree are defined as alternate roost trees). Detailed information on alternate roosts was provided in the annual research reports (3D Environmental Services Inc. 1994; 3D Environmental Services Inc. 1995; 3D Environmental Services Inc. 1996; American Consulting Engineers, Inc. 1998; American Consulting Engineers, Inc. 1999; American Consulting, Inc. 2000). A variety of trees were used as alternate roosts, but the majority were shagbark hickories. In 1999, 10 of 12 alternate roost trees were shagbark hickories. Both living and dead hickories were used as alternate roosts.

The primary roost tree that was used from 1996-2000 and most of the alternate roost trees that have been identified are located south of the HCP boundary in a privately owned woodlot. The woodlot is dominated by mature mixed hardwood trees, including many large shagbark hickories which appear to be preferred by roosting bats. The data collected to date suggest that this woodlot

is an important element of the habitat used by this maternity colony.

Data collected on radio-tagged bats in the project area have also allowed researchers to assess bat movements and foraging habits. Bats in the project area routinely fly at least 2 km from their roosts to forage (American Consulting Engineers, Inc. 1999). Some radio-tagged bats were found up to 5 km from the roost site. Generally, the distance traveled to foraging sites by bats in the project area have been similar to distances reported for bats in Illinois (Gardner et al. 1991b) and southern Indiana (Pruitt 1995, Montgomery Watson 1999). The data collected in the vicinity of the Indianapolis International Airport showed that individual Indiana bats fly to the same foraging areas nightly. However, individual bats from the same colony frequently used different foraging areas. Telemetry locations for many bats were concentrated in areas outside the HCP boundary, primarily to the south and southeast. Areas where locations were concentrated included the riparian corridor of the East Fork of White Lick Creek (EFWLC). As previously noted, use of the EFWLC riparian corridor included a primary maternity roost in a large cottonwood located adjacent to the creek. Patches of forested habitat not associated with the creek, as well as adjoining agricultural areas, were also used by foraging bats. Collectively, some use of almost all suitable Indiana bat habitat within the project area by radio-tagged bats has been documented. Bat habitat inside the HCP boundary appears to be used primarily for foraging; there are no known primary or alternate maternity roost sites inside the HCP boundary.

### 3.2.3 Other Wildlife Species

The total acreage inside the HCP boundary is 1,448 ha, of which 247 ha (17%) is categorized as bat habitat (American Consulting, Inc. 2001). As previously noted, much of the land categorized as bat habitat in the project area only supports scattered or immature trees (i.e., not mature deciduous forest), but would be expected to support at least limited habitat for forest wildlife species. Within the project area, the highest quality forest wildlife habitat is associated with forested stream corridors. The largest blocks of forested habitat remaining within the project area are adjacent to the East Fork of White Lick Creek and its tributaries. The wildlife community in the project area has not been rigorously surveyed, with the exception of the bat community, but based on habitat quality it is reasonable to assume that the fauna in the project area is typical of the fragmented forest/agricultural habitat that is extremely common in central Indiana.

The East Fork of White Lick Creek (EFWLC) and its tributaries provide drainage for the western two-thirds of the project area. Tributaries to EFWLC within the HCP boundary include Center Creek, Middle Creek, North Creek, South Branch, and Luck Creek. The eastern portion of the project area is drained by tributaries of the West Fork of the White River, which does not cross the project area. Only portions of the stream corridors in the project area are forested.

A biological community assessment of the East Fork of White Lick Creek was conducted by the Indiana Department of Environmental Management (IDEM) in July of 1997. This study established baseline conditions for the EFWLC within the limits of the proposed construction; results are detailed in IDEM (1997). The Index of Biotic Integrity class for the sites in the project

area was “good.” This class indicated that species richness was somewhat below expectation, especially due to the loss of the most intolerant forms; some species were present with less than optimal abundance or size distribution; and trophic structures showed some signs of stress. Water quality parameters for the sample sites were within the expected range. Vegetation adjacent to the stream within the project area includes pasture, old field with scattered large trees, and patches of floodplain forest.

Tributaries to the East Fork of White Lick Creek in the project area include Center Creek, Middle Creek, North Creek, South Branch, Luck Creek, Guilford Branch, and Flynn Creek. All of these are classified as intermittent streams. Biotic community assessment and water quality have not been assessed in these streams. Vegetation adjacent to these streams within the project area includes row crops, pasture, old fields, and patches of riparian forest.

### 3.3 Land Use

Land uses in the project area, based on the Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995), included: agricultural crop production 37.7%; highway right-of-way (dominated by fescue) 26.6%; forest 9.0%; residential 7.9%; commercial 7.4%; pasture 3.7%; and industrial 3.5%.

Land use patterns are similar in areas immediately surrounding the project area. Agriculture is the dominant land use. In addition, conversion of land to commercial and residential development is widespread. Forest cover is limited. According to forest inventory data, Marion County is less than 1% forested and Hendricks county is approximately 7% forested (Smith and Golitz 1988).

### 3.4 Cultural/Paleontological Resources

Section 106 of the National Historic Preservation Act (16 USC Section 470f) and the Section 106 regulations (36 CFR Part 800) require any federal agency having jurisdiction over a project which will be funded or licensed by a federal agency take into account the project’s effect on historic properties. The State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation must have opportunity to comment on the project’s potential effect on historic and cultural resources. This consultation is currently ongoing between the project applicants and the Indiana SHPO. Studies have been conducted to determine and evaluate the presence of pre-historic and historic artifacts within the proposed project area. A review of available inventories and site files has been conducted. Final reports on Phase I and Phase II archaeological investigations have been submitted to the SHPO. No construction activities will proceed until project applicants have notification from the SHPO indicating that potential impacts on historic and cultural resources have been considered and resolved. The Service will not issue the ITP to the project applicants until we receive notification that consultation with the SHPO on project impacts has been completed.



### 3.5 Local Socio-economic Conditions

Data prepared as an element of the Indianapolis Regional Transportation Plan process considered the area's growth potential. The outlook for the Indianapolis region is considered positive. A strong and diversified economy is expected to continue to grow, producing increased employment. The strong local transportation network will play a critical role in assuring this economic growth. Models for resident population, number of households, and employment through the year 2020 are presented in the Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995). Income and employment data, including per capita income, median household income, and employment by occupation are also summarized in that document.

### 4.0 ENVIRONMENTAL CONSEQUENCES

This discussion will cover the environmental consequences of the alternatives considered by the Service in issuance of a permit under Section 10(a)(1)(B) of the ESA by the Service. Specifically, the consequences of the avoidance, minimization, and mitigation procedures that would be implemented under the three alternatives considered in Section 2.0.

Environmental consequences of the applicants' proposed actions are not a component of this EA. The Federal Highway Administration is providing funding for road construction associated with this project, and therefore was responsible for documenting the environmental consequences of the proposed construction activities. The Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995) serves that purpose.

Extensive data on the ecology of Indiana bats in the project area were available to the Service in the evaluation of the environmental consequences of the alternatives considered here (3D Environmental Services Inc. 1994; 3D Environmental Services Inc. 1995; 3D Environmental Services Inc. 1996; American Consulting Engineers, Inc. 1998; American Consulting Engineers, Inc. 1999; American Consulting, Inc. 2000; John Whitaker, Indiana State University, personal communication). Information from additional published and unpublished reports on Indiana bats was also used.

A feature of Indiana bat biology that is integral to the discussion of impacts of alternatives is the fact that female Indiana bats exhibit strong site fidelity to summer roosting and foraging areas. That is, they return to the same summer range annually to bear their young. Traditional summer sites are essential to the reproductive success of local populations. It is not known how long or how far female Indiana bats will search to find new roosting habitat if their traditional roost habitat is lost or degraded. If they are required to search for new roosting habitat, it is assumed that this effort places additional stress on pregnant females at a time when fat reserves are low or depleted and they are already stressed from the energy demands of migration. This in turn could affect the reproductive fitness and productivity of the bats.

The importance of management of summer habitat to Indiana bats has received increased attention

in recent years, in light of continuing decline of the species' populations. The rangewide population of Indiana bats has declined approximately 60% since the species was listed in 1967. Based on censuses taken at hibernacula (caves where bats winter), the total known Indiana bat population is estimated to number about 353,000 bats (based on 1997 survey data). The most severe declines in wintering populations have occurred in two states: Kentucky, where 180,000 bats were lost between 1960 and 1997, and Missouri, where 276,000 Indiana bats were lost between 1980 and 1997. In Indiana populations dropped by 50,000 between the earliest censuses and 1980, but have rebounded to former levels in recent years. Currently, over half of all the hibernating Indiana bats in existence (approximately 182,500) winter in Indiana. The distribution of summer populations among states is not known. A variety of factors have contributed to Indiana bat population declines (U.S. Fish and Wildlife Service 1983). Because many known threats are associated with hibernation, protection of hibernacula has been a management priority since the species was listed. However, despite the protection of most major hibernacula, population declines have continued. Sustained population declines of Indiana bats, in spite of efforts to protect hibernacula, have led scientists to the conclusion that loss and degradation of summer habitat may be contributing to the species decline (Romme et al. 1995). Rigorous approaches to the management and conservation of summer habitat are needed.

Increasing fragmentation of forests could contribute to lower quality summer habitat for Indiana bats in some portions of the species' range. Research suggests that large blocks of forest habitat are beneficial to Indiana bats. Callahan (1993) noted: "Larger forest tracts probably increase the chances that a suitable range of roost trees will be present in the stand. Large forest components also provide an additional benefit to a philopatric species that uses an ephemeral resource (snags) for roosting." Kurta et al. (1996) noted that a relatively large area is needed to meet the roosting requirements of Indiana bats. A management goal to benefit Indiana bats in young, highly fragmented forests, typical in the midwestern United States and in the project area specifically, is to implement management activities that will result in larger trees, larger forest blocks, and greater connectivity of remaining forest patches.

#### 4.1 Alternative 1 - No Action Alternative: Avoiding Impacts Through Seasonal Tree Clearing

##### 4.1.1 Impacts to Fish, Wildlife, Plants, and their Habitats

Under the No Action Alternative, no incidental take permit would be issued and the HCP would not be implemented. There would be no existing forested parcels set aside for permanent protection and there would be no hardwood seedling mitigation plantings established and set aside for permanent protection.

Some existing forested parcels outside the HCP boundary would be protected, at least partially, because of legal limitations on development: 1) Parcels with documented Indiana bat use would receive protection under the ESA; development of these parcels would require consultation under Section 7 or Section 10; and 2) Development of floodplain forests would likely require permitting under Section 404 of the Clean Water Act. These laws would require that endangered species and

clean water concerns were incorporated into the development of the parcels.

#### 4.1.2 Impacts to Listed Species

Under this alternative, as well as the other 2 alternatives discussed in Chapter 4, the applicants would agree to seasonal tree clearing restrictions in the project area. Cutting an Indiana bat roost tree when bats are present in the tree is likely to result in bats being injured or killed; these impacts can be avoided by cutting trees when bats are not present on the project area. However, seasonal tree cutting restrictions do not address potential impacts to bats that will occur as the result of lost foraging and roosting habitat.

The Service reviewed the biological information that was available on the habitat in the project area and the data that have been collected on the maternity colony of Indiana bats in the area to determine if seasonal tree clearing restrictions would be adequate to avoid take of Indiana bats that will occur as the result of development in the project area. It was determined that in the case of the proposed actions that seasonal tree clearing restrictions alone would not be adequate to avoid take of Indiana bats. As previously discussed, the amount of forested habitat in the project area is near the minimum amount that is required to support summering Indiana bats. Even though trees would be cleared when the bats weren't present, the Service anticipates that the female bats and their young (estimated minimum population of 146 in 1999) that occupy the maternity colony, as well as an unquantifiable number of male and nonreproductive female adult bats which occupy the project area, would be negatively impacted by the loss of known foraging habitat and roosting habitat in the project area. As previously noted, Indiana bats exhibit site fidelity to summer roosting and foraging areas. The proposed actions will impact the quantity and quality of habitat within the traditional summer range of the colony that summers in the project area. Take of bats would occur in the form of harm, as defined by the ESA. Decreased fitness of individuals, reduced reproductive potential, and reduced overwinter survival could result. Not only would this colony face the loss of 139 ha of habitat in the project area, but negative impacts to bats would be expected to continue in the following years. Development is occurring at a rapid pace in the vicinity of the Indianapolis International Airport and it is expected that the habitat available to Indiana bat colony would continue to decline. It is the opinion of the Service that under the No Action Alternative the habitat conditions for the maternity colony would continue to degrade into the foreseeable future. Given the current fragmented nature of the habitat available to this colony, opportunities for the colony to relocate are limited. Continued loss and degradation of habitat could cause the colony to perish.

If the incidental take that is anticipated to occur in the project area were not permitted, then the applicants would risk liability for ESA Section 9 violations that would occur. If take occurred without a permit, the Service could take appropriate criminal and/or civil enforcement action.

#### 4.1.3 Cumulative Impacts

Under the No Action Alternative, bats in the project area would face the loss of approximately

139 ha of habitat. Models developed for the Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995) indicated that development in the area surrounding the project area would occur at a rate of 33 ha per year during the years immediately following the project. Even though only a small portion of the landscape in the surrounding area is forested, this continued development will lead to additional habitat loss for Indiana bats. This continued habitat loss is particularly alarming given that the amount of forested habitat in the area is already near the minimum required to support Indiana bats.

Under this alternative, there is no existing bat habitat protected or seedlings planted for mitigation. If the Service used a similar approach in addressing the impacts of future development surrounding the project area, habitat conditions would continue to degrade into the foreseeable future. Without research and monitoring (required under Alternative 3) to determine how bats were responding to habitat loss resulting from development, there would be no basis for implementing management activities that would serve to address the habitat needs of the Indiana bats in the increasingly fragmented landscape. Cumulative effects of the continued loss and degradation of habitat could cause the colony in the project area to perish.

If this approach to addressing impacts to summer habitat (i.e., seasonal cutting restrictions only) were implemented across the range of the species, we anticipate that this would lead to the continued decline of Indiana bat populations rangewide. Populations of Indiana bats have continued to decline, in spite of efforts to protect major hibernacula. Scientists have concluded that loss and degradation of summer habitat may be contributing to the species decline (Romme et al. 1995) and that management and conservation of summer habitat are needed.

#### 4.2 Alternative 2 - Develop an HCP which includes a Conservation Easement on the Maternity Roost Site Parcel

Under this alternative, the applicants would mitigate for loss of Indiana bat habitat in the project area by securing a conservation easement on the 36 ha woodlot that is known to contain a primary roost tree which was used by the Indiana bat maternity colony from 1996-2000. The woodlot also contains many of the alternate roosts used by the colony. The applicants originally sought to acquire the parcel for permanent protection, but based on negotiations with the landowner it was determined that a 25-50 year conservation easement would be the longest term of protection that would be considered. In addition, the applicants would plant 140 ha of hardwood seedlings as a component of their mitigation plan and would impose seasonal restrictions on the clearing of trees in the project area. Survival of seedlings planted for mitigation would be monitored, and remedial action taken if survival dropped below an acceptable level.

##### 4.2.1 Impacts to Fish, Wildlife, Plants, and their Habitats

The woodlot which would be protected under this alternative is dominated by mature mixed hardwood trees; it is one of the largest woodlots remaining within a 3-mile radius of the project area. The woodlot also contains older and larger trees compared to most of the forest patches

remaining in this area. Forest wildlife in the project area would benefit from the long-term protection of this woodlot. Native woodland plants that require shade and a relatively undisturbed forest floor would also be expected to benefit, although there has been no inventory of herbaceous vegetation in the woodlot. A small intermittent drainage runs through one corner of the woodlot. Long-term protection of the woodlot would help to maintain water quality in this drainage, but the drainage is intermittent and supports a limited aquatic community.

Native plants and wildlife would also be expected to benefit from the planting of 140 ha of hardwood seedlings. Areas where seedlings would be planted are owned by the IAA and most are currently used for hay or row crop production. Planting of these areas to hardwood seedlings would initially benefit species which use early successional forest stands, and as the plantings matured the wildlife species composition would change accordingly. Areas to be planted include agricultural fields that are interspersed with approximately 168 ha of hardwood seedlings previously planted by the IAA. In the long term, these seedling plantings will provide the largest forested block of habitat available to forest wildlife species within a 4-mile radius of the project area. These areas would be protected from development in perpetuity and would significantly improve the potential of this area to continue to support forest wildlife species. Numerous intermittent and permanent streams, all draining into the East Fork of White Lick Creek, run through the proposed mitigation planting area. Plantings immediately adjacent to the stream corridor would improve in-stream habitat conditions directly by providing shade and, eventually, in-stream structure. Plantings would also be expected to result in improved water quality by providing a riparian buffer that would reduce runoff of sediment and contaminants into the stream.

#### 4.2.2 Impacts to Listed Species

As previously discussed, female Indiana bats return to the same summer range annually to bear their young and traditional summer sites are essential to the reproductive success of local populations. Extensive research was conducted on Indiana bats in the project area during the summers of 1994 through 2000 and it was documented that the woodlot proposed for protection is the primary maternity roosting area used by the Indiana bats in the project area. Under this alternative, this woodlot would be protected through a conservation easement for 25-50 years. Optimal management for Indiana bats could occur in the woodlot during the period when the conservation easement was in place. In contrast, under other alternatives, the woodlot would not get the same level of protection. If no conservation easement were in place and the owner of the woodlot wanted to modify the parcel such that take of Indiana bats would occur, then the owner would be required to consult with the Service under Section 10 of the ESA. The Service would have the authority to impose restrictions that would avoid and minimize take to the maximum extent practicable, and to mitigate for unavoidable impacts.

Most roost trees used by the bats in this colony, including the primary roost, are dead. Indiana bat roost trees may be habitable for only 2-8 years under natural conditions (Gardner et al. 1991a). The primary roost tree used by the maternity colony has been used annually since 1996; an

inspection of the tree in November 2000 by BFO biologists revealed that much of the bark has fallen off and that the suitability of the tree as a maternity roost may be declining. However, there are ample large dead and dying trees in the woodlot and the supply of alternative roosting sites is considered very good. Under this alternative, we anticipate that this woodlot would continue to produce quality Indiana bat roosting habitat through the 25-50 years that the conservation easement would be in place. However, the colony has also used roost sites outside this woodlot in spite of the fact that there are suitable unused roosts within the woodlot. It is typical for Indiana bat maternity colonies to utilize multiple roost sites. It is not known how many alternate roosts must be available to assure retention of a colony within a particular area, but the availability of roosts in forested tracts distributed in the colony's range appears important (Callahan 1993). Therefore, it is assumed that the colony would continue to depend on alternate roost sites outside the protected woodlot. In addition, the woodlot is not large enough to meet the foraging needs of the colony. While foraging does occur within this woodlot, the colony would also continue to be dependent on additional forested areas outside this woodlot to find adequate foraging habitat to support the colony.

Data collected on radio-tagged bats in the project area have allowed researchers to assess bat movements and foraging habits. Bats in the project area routinely fly at least 2 km from their roosts to forage (American Consulting Engineers, Inc. 1999). Some radio-tagged bats were found up to 5 km from the roost site. Generally, the distance traveled to foraging sites by bats in the project area have been similar to distances reported for bats in Illinois (Gardner et al. 1991b) and southern Indiana (Pruitt 1995, Montgomery Watson 1999). At least limited use of almost all suitable Indiana bat habitat within a 2-km radius of the primary roost tree by radio-tagged bats has been documented. The availability of foraging habitat outside the protected woodlot would continue to be an important issue in the survival of the maternity colony.

In addition to a conservation easement on the maternity roost parcel, this alternative also includes planting 140 ha of hardwood seedlings as a component of the mitigation for bat habitat that will be lost. Survival of seedlings planted for mitigation would be monitored, and remedial action taken if survival dropped below an acceptable level. Seedling plantings would be planned: 1) to improve the connectivity of the protected woodlot to other forested fragments within the range of the maternity colony; and 2) in the long term, to provide a large block of forested habitat that would be protected from development and managed for the benefit of Indiana bats. These plantings would enhance the quality of foraging and roosting habitat. Plantings would increase the potential for the long-term viability of the maternity colony in the project area by linking existing habitat and, as the trees matured, creating additional habitat.

Large blocks of forested habitat are generally thought to be beneficial to summering Indiana bats. In highly fragmented forests, such as that in the project area, management activities that result in larger trees, larger forest blocks, and greater connectivity of remaining forest patches are generally thought to improve Indiana bat summer habitat conditions. Currently, the largest single block of forested habitat available to the maternity colony in the project area is approximately 36 ha in size. The 140 ha of seedling plantings planned under this alternative would be situated to provide

for wooded corridors along relocated stream channels, fill gaps between existing forested patches, and expand on 168 ha of existing plantings. In the long term, these plantings would significantly increase the size of the largest forested block available to Indiana bats.

In addition to increasing the overall size of the forested block available to bats, plantings would also increase the connectivity of that block to other forest blocks and to the riparian corridor. As previously noted, a relatively large area is needed to support the foraging needs of an Indiana bat colony. Bats will cross some open land to reach foraging areas, but research suggests that bats are more likely to move through forested corridors when moving between habitat patches.

Considering the fragmented nature of the forested habitat available to Indiana bats in and around the project area, it is assumed that increasing the connectivity of the remaining fragments would increase the value of those fragments to bats.

Riparian corridors are generally thought to provide relatively high quality Indiana bat habitat, and research in the project area has documented high use of the East Fork of White Lick Creek corridor by bats. Some mitigation plantings would occur in areas along creeks in the project area that are not currently forested, and would also be used to link some existing forest fragments to the riparian corridor. In Illinois, Gardner et al. (1991b) found that forested stream corridors, and impounded bodies of water, were preferred foraging habitats for pregnant and lactating Indiana bats, which flew up to 2.4 km from upland roosts to forage. Females typically utilize larger foraging ranges than males (Garner and Gardner 1992). Upland forests also provide foraging habitat. Romme et al. (1995) cite several studies which document that Indiana bats also forage in upland forests and research in the project area has documented extensive use of upland forests and forest/agricultural edges for foraging.

#### 4.2.3 Cumulative Effects

Under all alternatives, bats in the project area would face the loss of approximately 139 ha of habitat as the result of project impacts. Additional habitat loss is projected; models developed for the Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995) indicated that development in the area surrounding the project area would occur at a rate of 33 ha per year during the years immediately following the project.

Under this alternative, a conservation easement on the woodlot that contains most of the known maternity roost sites for this colony would ensure that for the next 25-50 years (the length of the proposed conservation easement on the parcel) no detrimental habitat alteration would occur in this woodlot. This conservation easement would help to alleviate the impacts of future development on roosting habitat. However, it is known that additional roosting and foraging areas are needed to support the colony, and this habitat could be adversely impacted by development.

A minimum of 140 ha of hardwood seedlings would be planted and permanently protected under this alternative. These seedling plantings would help to alleviate cumulative effects of additional development in the immediate vicinity of the project area; the 140 ha of plantings would be

permanently protected from future development. The immediate value of the mitigation plantings to bats would be: 1) to provide areas that would not be cleared for development that link existing habitat patches; and 2) to protect water quality by protecting riparian areas from development. Over time, we anticipate that the mitigation plantings would develop into quality roosting and foraging habitat for Indiana bats.

There is a degree of uncertainty involved in determining whether Alternative 2 provides adequate protection of the maternity colony from effects of cumulative development in the project area. After 50 years we anticipate that the mitigation plantings would provide roosting and foraging habitat for Indiana bats if the maternity colony still occupied the area. However, whether or not the colony could persist for 50 years may depend on what parcels of existing habitat were developed and which were left undisturbed. As parcels of existing habitat are developed, the Service will consult with project proponents through Section 7 or Section 10 of the ESA; a large number of landowners could potentially be involved. It is difficult to predict how much existing habitat would be preserved through these consultations, but it is reasonable to expect that some of the habitat would be protected. However, it is uncertain if consultations on individual parcels, cumulatively, will secure adequate habitat to sustain the colony.

If this approach to addressing impacts to summer habitat (i.e., protecting high quality roosting habitat only) were implemented across the range of the species, we anticipate that this would lead to the continued decline of Indiana bat populations rangewide. It is known that reproductively active Indiana bats forage up to 2.4 km from the maternity roost site. There must be adequate habitat available within a 2.4-km radius of each maternity colony to support the foraging needs of the colony. As noted previously, Indiana bat populations have steadily declined since the species was listed in 1967. A comprehensive approach to Indiana bat summer habitat protection, which considers both roosting and foraging needs of the Indiana bat maternity colonies, is needed.

#### 4.3 Alternative 3 - Proposed Action: Develop an HCP which includes Permanent Protection of Existing Bat Habitat, Mitigation Plantings, and an Extensive Research and Monitoring Program

##### 4.3.1 Impacts to Fish, Wildlife, Plants, and their Habitats

A minimum of 151 ha of existing forested areas would be protected in perpetuity under this alternative (71 ha inside the HCP boundary and 80 ha outside the HCP boundary). No disturbance or alteration of vegetation would occur in these parcels unless the Service concurred that the activities would be beneficial to Indiana bats. The goal in managing these areas would be to provide sustained roosting and foraging habitat for Indiana bats. These areas currently support, and would continue to support, mixed hardwood stands. Forest wildlife and native woodland plants in the project area would benefit from the long-term protection of these areas. Not only do these areas directly provide habitat for forest wildlife, but they also serve as travel corridors that improve the connectivity of remaining forests in and adjacent to the project area to more extensive forested areas (particularly to the south of the project and mitigation areas). Rapid development is occurring in and around the project area. It is expected that conversion of forested land for



development will continue to occur in this area into the foreseeable future. Permanent protection of forested parcels under this alternative would ensure that some habitat for forest wildlife will be maintained in spite of intensive pressure for development.

All of the parcels to be protected outside the HCP boundary and most of the parcels inside the HCP boundary are within the East Fork of White Lick Creek watershed. The Service was consulted in selecting the parcels that would be protected under this alternative, and emphasis was on the protection of parcels within the riparian corridor of the creek. Protecting areas within the East Fork of White Lick Creek watershed, particularly parcels immediately adjacent to the stream, would improve in-stream habitat conditions and directly benefit the biological integrity of the stream by providing shade and in-stream structure. Protecting areas within this drainage would also be expected to result in improved water quality by providing a riparian buffer that would reduce runoff of sediment and contaminants into the stream.

#### 4.3.2 Impacts to Listed Species

This alternative is preferred because conservation measures (detailed in section 2.2.3) that the applicants would incorporate into the project would enhance the potential that the maternity colony of Indiana bats in the vicinity of the project area will be able to persist over the long-term. The purpose of these measures is to avoid, minimize, and mitigate impacts to Indiana bats to the maximum extent practicable. Conservation measures include: seasonal tree cutting restrictions; permanent protection of existing bat habitat both within and outside the HCP boundary; planting (and permanently protecting) a minimum of 140 ha of hardwood seedlings to improve connectivity of existing bat habitat and to create additional bat habitat; an extensive monitoring and research program for Indiana bats; and a public outreach program on Indiana bats. This alternative also allows the applicants to proceed with proposed development within their financial constraints and within a reasonable time frame.

Seasonal tree clearing restrictions will avoid death or injury to Indiana bats that could occur if bats were roosting in the trees at the time of felling. All trees will be cleared between September 16 and April 14, when Indiana bats are not known to occupy maternity roosts.

Another conservation measure included under this alternative is the permanent protection of a minimum of 71 ha of existing bat habitat within the HCP boundary and 80 ha of existing bat habitat outside the HCP boundary. Because female Indiana bats exhibit strong site fidelity to summer roosting and foraging areas, the permanent protection of existing habitat within the traditional summer range of this maternity colony is expected to help the colony to adjust to the disturbances that will occur within its range. All forested habitat that will be protected as part of the mitigation under this alternative is within the range of the maternity colony and has been used by the colony for foraging or roosting. In addition to providing habitat for the colony, parcels proposed for protection outside the HCP boundary were selected such that they improve the connectivity of remaining patches of habitat within the colony's range. The goal of these measures is to ensure that there is adequate habitat, and that habitat is accessible to bats, within

the traditional summer range of the colony to sustain the colony until mitigation plantings are adequately mature to supply additional foraging and roosting habitat for the bats.

This alternative also includes the planting of 140 ha of hardwood seedlings, and protection of planted areas in perpetuity, as a component of the mitigation for bat habitat that will be lost. The benefits of hardwood seedling plantings were discussed in section 4.1.2 Impacts to Listed Species; the same benefits would be realized under Alternative 3 and that discussion is not repeated. However, under Alternative 3, there would be more existing habitat protected compared to Alternative 2, and this is expected to enhance the value of the mitigation plantings. The amount and distribution of existing habitat protected under Alternative 3 will enhance the potential that the maternity colony will have sufficient roosting and foraging habitat to sustain itself in its traditional summer range.

Over time, the mitigation plantings in conjunction with the adjoining forested areas which will be preserved in perpetuity are anticipated to result in a net benefit to Indiana bats in the immediate vicinity of the HCP as compared to current conditions. It is expected that limited roosting habitat may be available in the plantings in approximately 25 years, and the plantings may provide limited foraging habitat and potentially be used as travel corridors by bats even sooner. Within 50 years, the plantings are expected to provide quality roosting habitat. Compared to current baseline conditions, there will be more forested habitat, a larger block of contiguous habitat, greater connectivity among habitat patches, and improved habitat conditions along the riparian corridors. All of these habitat trends should be beneficial to Indiana bats. The plantings and existing forested parcels used for mitigation will be protected in perpetuity. This permanent protection is particularly crucial because future opportunities for bat conservation within the range of this colony are limited. These permanently protected parcels will be the largest block of habitat available to Indiana bats, as well as other species of forest wildlife, over a large geographic area. As previously discussed, a management goal to benefit Indiana bats in young, highly fragmented forests, typical in the midwestern United States and in the project area specifically, is to implement management activities that will result in larger trees, larger forest blocks, and greater connectivity of remaining forest patches.

An extensive monitoring and research program is also included as part of the mitigation under this alternative. The Indiana bat colony in the project area would be studied for 15 years, beginning with the first summer following the start of construction. The details of the proposed monitoring plan are provided in the applicants' HCP (American Consulting, Inc. 2001) and have been developed in consultation with the Service. As previously noted, the colony in the vicinity of the project area has been studied intensely since 1994; this is the longest that any single colony of Indiana bats has ever been studied. The baseline data that is available on this colony, in conjunction with the data that would be collected through the applicants' monitoring program, will allow the Service to thoroughly evaluate the response of bats to the disturbance which will occur in the project area as well as the mitigation measures that are implemented. This will be the first time that information of this magnitude has been collected over the long term on an Indiana bat colony. The information collected through this monitoring program will make a significant

contribution to our understanding of Indiana bats and it is hoped will make a contribution to the recovery of the species.

Under this alternative, the applicants will also work with the Service's BFO to develop and implement an outreach program to educate the public regarding the Indiana bat. The Indiana bat recovery plan (U.S. Fish and Wildlife Service 1983) identifies public education on Indiana bats as a priority activity needed for recovery of the species. The presence of this Indiana bat maternity colony in close proximity to the Indianapolis metropolitan area provides a unique opportunity for public outreach programs on the species.

#### 4.3.3 Cumulative Effects

Under all alternatives, bats in the project area would face the loss of approximately 139 ha of habitat as the result of project impacts. In addition, additional habitat loss is projected; models developed for the Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995) indicated that development in the area surrounding the project area would occur at a rate of 33 ha per year during the years immediately following the project.

Under this alternative, a minimum of 151 ha of existing bat habitat would be permanently protected within the range of the Indiana bat maternity colony that uses the project area. All parcels to be protected would have documented use by bats. Permanent protection of these parcels would ensure that no alteration of habitat could occur on these parcels unless the Service concurred that the activity would be beneficial to Indiana bats. These parcels would help to alleviate the impacts of future development on roosting and foraging habitat for this colony. Not only will the protected parcels directly provide roosting and foraging habitat, but these parcels will also be situated to improve connectivity among other existing patches of habitat.

A minimum of 140 ha of hardwood seedlings would be planted and permanently protected under this alternative. These seedling plantings would help to alleviate cumulative effects of additional development in the immediate vicinity of the project area; the 140 ha of plantings would be permanently protected from future development. The immediate value of the mitigation plantings to bats would be: 1) to provide areas that will not be cleared for development that link existing habitat patches; and 2) to protect water quality by protecting riparian areas from development. Over time, we anticipate that the mitigation plantings will develop into quality roosting and foraging habitat for Indiana bats.

This alternative would provide the best chance that the maternity colony would be able to persist in spite of increasing pressure for development in the area surrounding the Indianapolis International Airport. The 151 ha of existing habitat that would be protected provide habitat and travel corridors for Indiana bats. After 50 years we anticipate that the mitigation plantings would provide quality roosting and foraging habitat; we project that long-term habitat conditions in the project area would be better than existing conditions.

As parcels of existing habitat (those not permanently protected under this alternative) were developed, the Service would consult with project proponents through Section 7 or Section 10 of the ESA. It is difficult to predict how much existing habitat would be preserved through these consultations, but it is reasonable to expect that some of the habitat can be protected. It is the opinion of the Service that the 151 ha of existing habitat protected under this alternative would enhance the potential that an adequate amount of habitat would be protected to sustain the maternity colony as additional development occurs within its range.

Cumulative impacts to Indiana bats rangewide would be minimal if the Service used this approach, as compared to the approach represented by Alternatives 1 or 2, on consultations regarding this species. In the long-term, this approach provides for no net loss of Indiana bat habitat. The mitigation plantings will replace the Indiana bat habitat that will be lost. In fact, when mature the mitigation plantings will provide higher quality habitat than the habitat that will be lost. Recognizing that plantings do not address immediate habitat needs of the colony, this approach to mitigation also requires that existing habitat also be protected. In the long-term, there will be a large block of high quality Indiana bat habitat that is permanently protected. Permanent protection of habitat can be particularly beneficial to Indiana bats, because they return to the same summer range year after year. The extensive monitoring and research program included in this alternative also allows for adaptive management; impacts of development and of mitigation will be known and adjustments can be made to optimize the value of mitigation parcels for bats. This approach also includes a public outreach component which will aid the Service in developing additional support for Indiana bat conservation activities over time.

If this approach to addressing impacts to summer habitat were implemented across the range of the species, we anticipate that this would lead to improved summer habitat conditions for Indiana bats. It is the opinion of the Service that this comprehensive approach to Indiana bat summer habitat protection, which considers both roosting and foraging needs of the Indiana bat maternity colonies, is needed for recovery of the species.

#### 4.4 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 Federal Register 7629 (1994), directs federal agencies to incorporate environmental justice in their decision making process. Federal agencies are directed to identify and address as appropriate, any disproportionately high and adverse environmental effects of their programs, policies, and activities on minority or low-income populations.

No environmental justice issues exist for any of the alternatives considered in this EA. Only properties owned by the Indianapolis Airport Authority are being considered for permanent protection. No minority or low-income populations would be displaced or negatively affected in any way by the proposed action or any other alternative. None of the mitigation activities that would be implemented under any of the alternatives would create any environmental pollution.

#### 4.5 Tabular Summary of Effects

Table 1. Summary of effects and key conservation measures associated with the alternatives.

EFFECTS/ CONSERVATION MEASURES	ALTERNATIVE NUMBER		
	ALTERNATIVE 1 (NO ACTION)	ALTERNATIVE 2	ALTERNATIVE 3 (PREFERRED ALTERNATIVE)
Indiana bat habitat permanently lost	139 ha	139 ha	139 ha
Indiana bat habitat protected	none	36 ha (25-50 year conservation easement)	151 ha protected in perpetuity
Hardwood seedlings planted/protected	none	140 ha	140 ha
Seasonal tree clearing restrictions?	yes	yes	yes
Roosting habitat: avoidance, minimization, and mitigation	none	Parcel containing primary maternity roost would be protected for 25-50 years.	151 ha of existing habitat protected in perpetuity would supply suitable roosting habitat. Known primary roost site would not be protected as part of mitigation plan, but alteration of the site which would result in incidental take of bats would require ESA consultation.
Foraging habitat: avoidance, minimization, and mitigation	none	Little protection of existing foraging habitat; mitigation plantings would increase long-term availability of foraging habitat and connectivity among existing habitat patches.	151 ha of existing habitat protected in perpetuity would supply foraging habitat and would also provide corridors linking additional habitat patches. Mitigation plantings would further increase long-term availability of foraging habitat and connectivity among existing habitat patches.
Cumulative effects on Indiana bats	Habitat conditions for Indiana bats expected to continue to degrade into the foreseeable future	Uncertain. Cumulative effects would depend on adequacy of regulatory mechanisms to protect additional habitat.	Effects minimized by HCP; positive model for future action. Habitat permanently protected through the HCP provides foundation for sustaining habitat needs of the maternity colony. Long-term habitat quality for Indiana bats will be better than current condition.

Table 1 (continued).

EFFECTS/ CONSERVATION MEASURES	ALTERNATIVE NUMBER		
	ALTERNATIVE 1 (NO ACTION)	ALTERNATIVE 2	ALTERNATIVE 3 (PREFERRED ALTERNATIVE)
Potential incidental take minimized and mitigated to the maximum extent practicable?	no	No. Impacts to foraging habitat not adequately addressed.	Yes. Balanced approach to addressing foraging and roosting needs of the colony. Research and monitoring program will allow for adaptive management of bat habitat.
Monitoring and research program	none	Hardwood seedling mitigation plantings would be monitored.	Hardwood seedling mitigation plantings would be monitored. Bat surveys would be conducted for 15 years to assess effectiveness of mitigation and allow for adaptive management.
Outreach and education program	none	none	Indiana bat public education program will be developed in consultation with the Service.
Impacts on fish, wildlife, and plant habitat	139 ha of forested or partially forested habitat permanently lost; no existing habitat protected; no seedling mitigation plantings	139 ha of forested or partially forested habitat permanently lost; 25-50 year conservation easement on 36 ha of mature hardwood forest and planting of 140 ha of hardwood seedlings would be provided to mitigate those habitat losses in the short and long term, respectively.	139 ha of forested or partially forested habitat permanently lost; permanent protection of 151 ha of existing forest and planting of 140 ha of hardwood seedlings would be provided to mitigate those habitat losses in the short and long term, respectively.
Cultural resource impacts	Impact of construction activities on cultural resources is being addressed. No additional impacts from no action alternative.	Impact of construction activities on cultural resources is being addressed. Minimization and mitigation measures would not result in additional impacts.	Impact of construction activities on cultural resources is being addressed. Minimization and mitigation measures would not result in additional impacts.
Does the alternative protect applicant from potential Section 9 violations?	No. Applicants risk liability for ESA Section 9 violations for non-permitted incidental take of Indiana bats	Yes. Applicants would have an ESA Section 10 incidental take permit.	Yes. Applicants would have an ESA Section 10 incidental take permit.

Table 1 (continued).

EFFECTS/ CONSERVATION MEASURES	ALTERNATIVE NUMBER		
	ALTERNATIVE 1 (NO ACTION)	ALTERNATIVE 2	ALTERNATIVE 3 (PREFERRED ALTERNATIVE)
Does alternative meet the applicants time and cost needs?	There would be no added cost to the applicant to implement this alternative.	Applicants determined that the cost of acquiring the conservation easement would exceed estimated fair market value and that negotiations for acquiring the easement would be lengthy.	Applicants considered the time and costs associated with this alternative as acceptable.

## 5.0 LIST OF PREPARERS

<u>Name</u>	<u>Affiliation</u>	<u>Contributions</u>
Lori Pruitt	U.S. Fish and Wildlife Service, Bloomington Field Office	Project alternatives Endangered Species Indiana bat ecology
Scott Pruitt	U.S. Fish and Wildlife Service, Bloomington Field Office	Project background Reviewer BFO Supervisor
Christine Lascelles	American Consulting, Inc.	Project description Applicants' consultant
Robert Hittle	American Consulting, Inc.	Project Manager Applicants' consultant
Jeff Gosse	U.S. Fish and Wildlife Service, Region 3 Office	NEPA Review and Coordination
Pete Fasbender	U.S. Fish and Wildlife Service, Region 3 Office	ITP preparation Permit Coordinator
TJ Miller	U.S. Fish and Wildlife Service, Region 3 Office	Endangered Species Chief of ES Operations

## 6.0 COMMENTS AND COORDINATION

In the preparation of the Environmental Assessment for the Six Points Road Interchange (American Consulting Engineers, Inc. 1995), extensive agency coordination was conducted. Input and comments were solicited from the following agencies: National Park Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Department of Housing and Urban Development, U.S. Environmental Protection Agency, Natural Resources Conservation Service (State Office, Hendricks County Office, Marion County Office), Indiana Department of Natural Resources, Indiana Geological Survey, Indiana Department of Transportation, Indiana Department of Environmental Management, Indianapolis Department of Public Works, Indianapolis Airport Authority, Hendricks County Engineer, Archaeological Resources Management Service. A public hearing on the project was held in December 1995 at Plainfield High School in Plainfield, Indiana. No comments regarding project impacts on Indiana bats were voiced at the hearing (Christine Lascelles, American Consulting, Inc., personal communication January 2001).

The HCP had not been prepared at the time of the 1995 EA for the project, but the EA did include a discussion of the fact that an HCP may be prepared to address project impacts to Indiana bats. No opposition to the HCP was voiced in comments on the EA. In the years following the EA to the present, there has been extensive media coverage of the project in the Indianapolis area, including coverage of the impacts to bats. This media coverage has generated some public interest in the status of the conservation of Indiana bats in the project area, and the Service has addressed questions on this topic as issues arose. The Service is not aware of any opposition to the development of the HCP as a means of addressing Indiana bat impacts in the project area.

A Federal Register notice will be published documenting the availability of the HCP and this EA and providing for a 60-day public comment period on those documents. Both documents will be made available for inspection in public places and copies will also be provided to individuals on request. The EA will also be available on the Service's website at:

<http://midwest.fws.gov/NEPA/>

Comments received during the public comment period will be fully addressed in the Biological Opinion prepared by the Service prior to issuance of an Incidental Take Permit.



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